Mobile Lidar: The Benefits to Airports from an Operations and Safety Perspective

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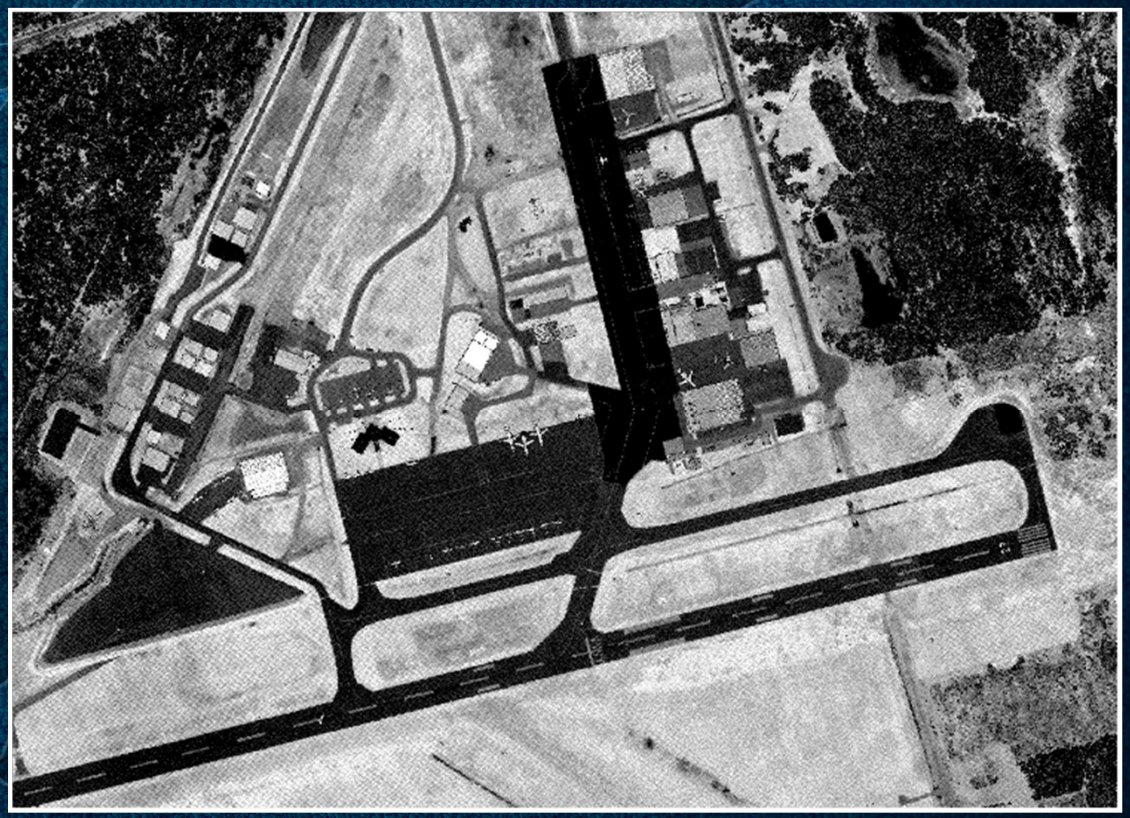
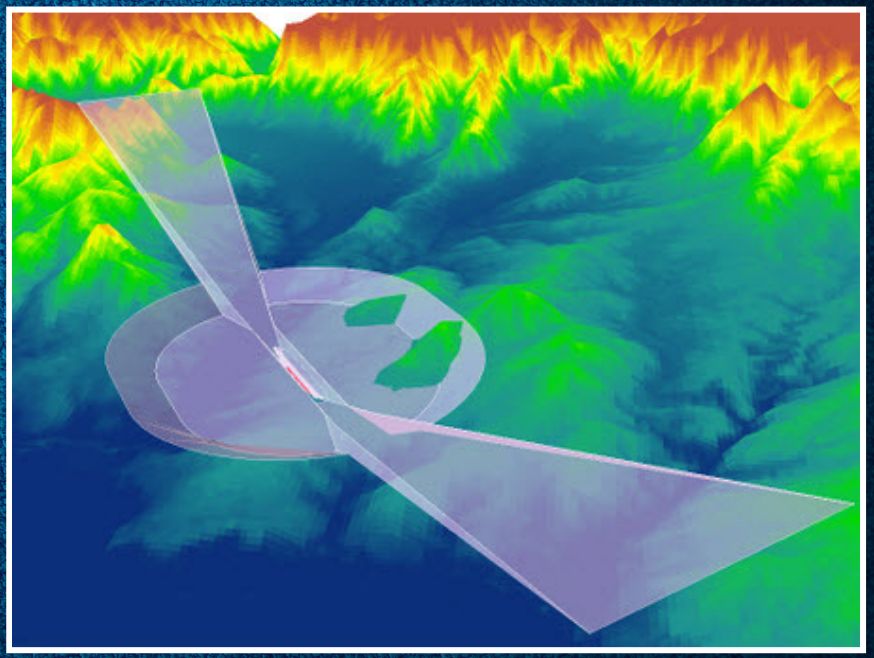


Outline

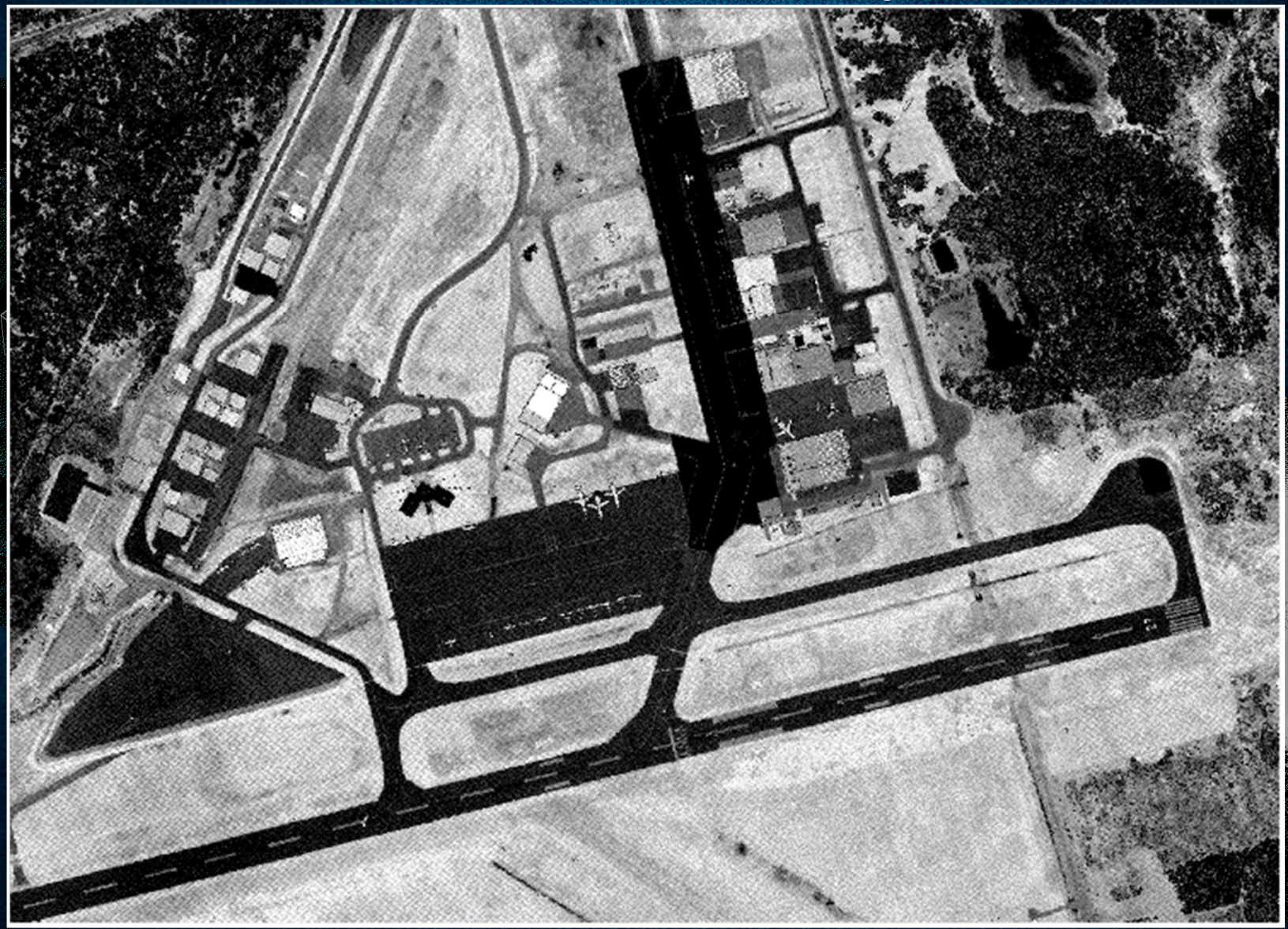
1. Lidar Overview
2. What lidar data looks like
3. Platforms
4. Specific uses of lidar in the airport and in airfield management
5. Challenges (time permitting)



What is Lidar?

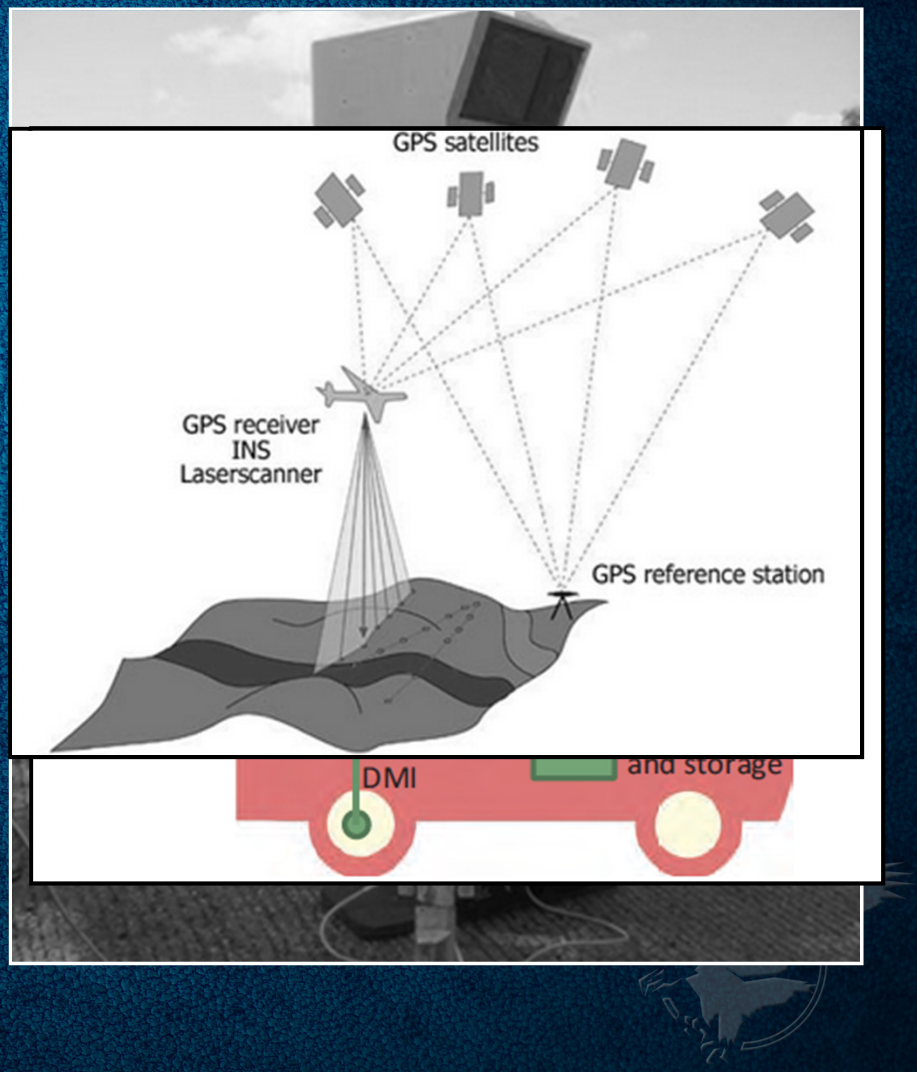
- Light Detection and Ranging
- Remote sensing method used to model objects, including the surface of the Earth
- Pulsed laser light; 1 – 1.5 micron, near-infrared band
- Measures distance to an object (elapsed time * speed of light)
- Enabling technologies: GPS, IMU, Scanners and Lasers allow computation of precise location of point on surface of an object

The lidar point cloud



Types of Lidar platforms

1. Airborne
2. Static, or Tripod Mounted
3. Mobile, or ground-vehicle based.



The Airport's Need

- Strong need for information to promote effective decision – making
- Geo-spatial data and information plays a major role in any airport, from small GA fields to large international hubs
- Increased efficiency, using and integrated approach "One data set to serve many functions"
- Value - added

Uses in the airport

- Discussion of 4 specific applications of lidar data or models generated from lidar data

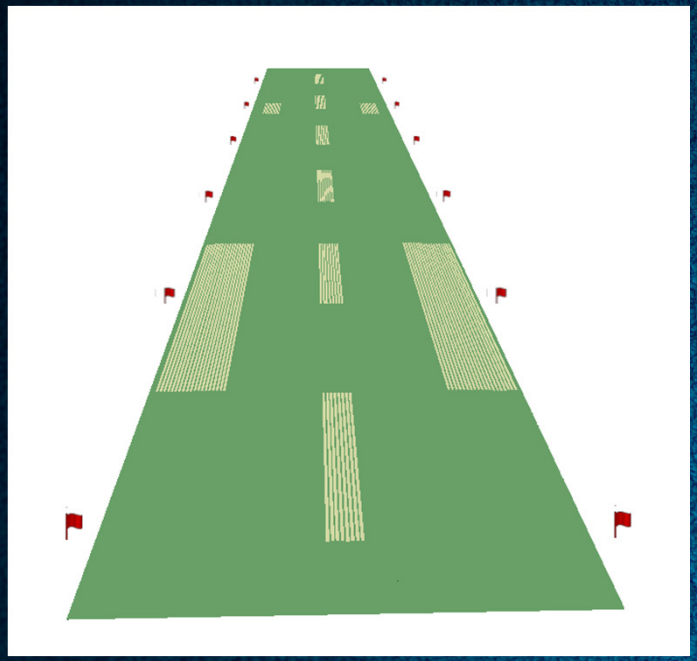
1. Pavement Management
2. Extraction of Features and Assets
3. EMAS Placement and Management
4. Safety and Situational Awareness

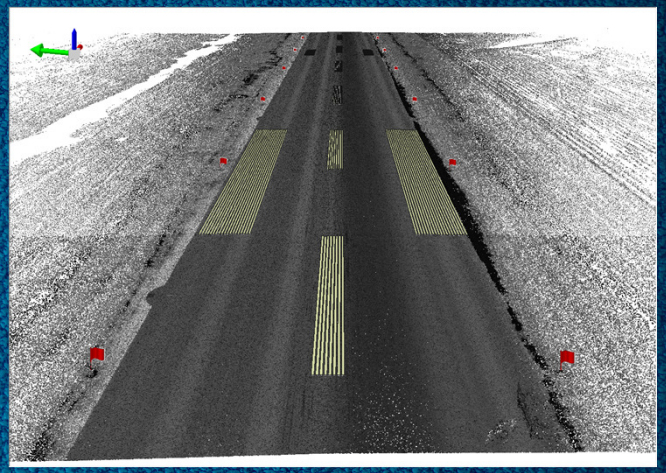
Pavement Management

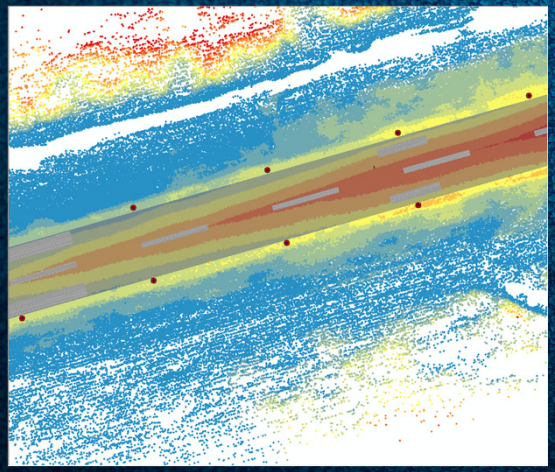
- Detect cracks >1/4”
- Data can comply with aGIS deliverables (5300-15-17-18)
- Can accelerate visual reviews
- Airport’s higher density of aircraft operations
- More complex pavement system
- Similar costs to traditional survey and manual inspection work
- Ability to do what is required
- Speed, data collection time reductions, limiting project’s impact

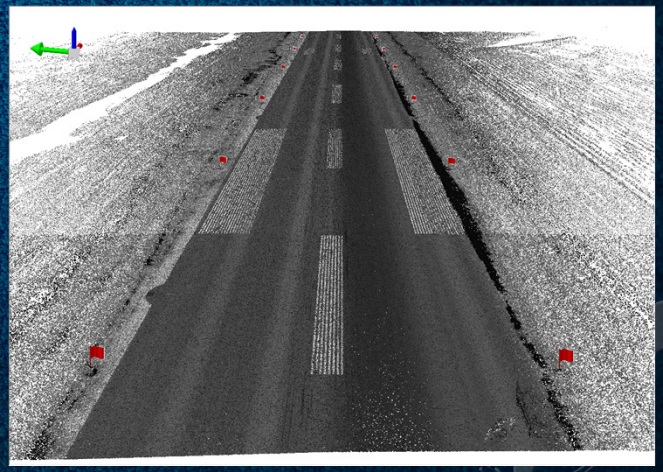
It cannot replace visual inspection (ASTM D5340-112)

Features/Assets



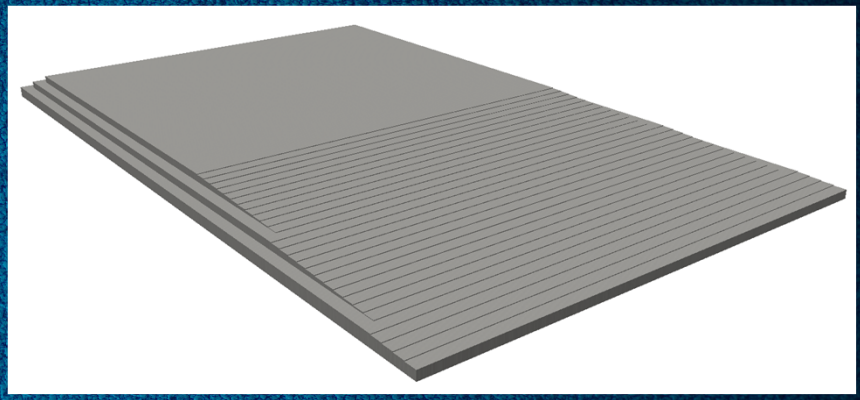






EMAS Beds

- Preparation of area
- 3D model using lidar
- Inspect at workstation
- Use computer program to find any change or imperfection in model which is based on real object
- Model can be imported into inspection software which can aid in real-time visual inspections



- Surface Cracks (<6”); Severe Cuts or cracks (>6”)
- Minor Depressions, surface indentations, severe Depressions
- Holes
- Loose Seam seal
- Abrasion attack

Safety & Situational Awareness

Driver Enhanced Vision Systems

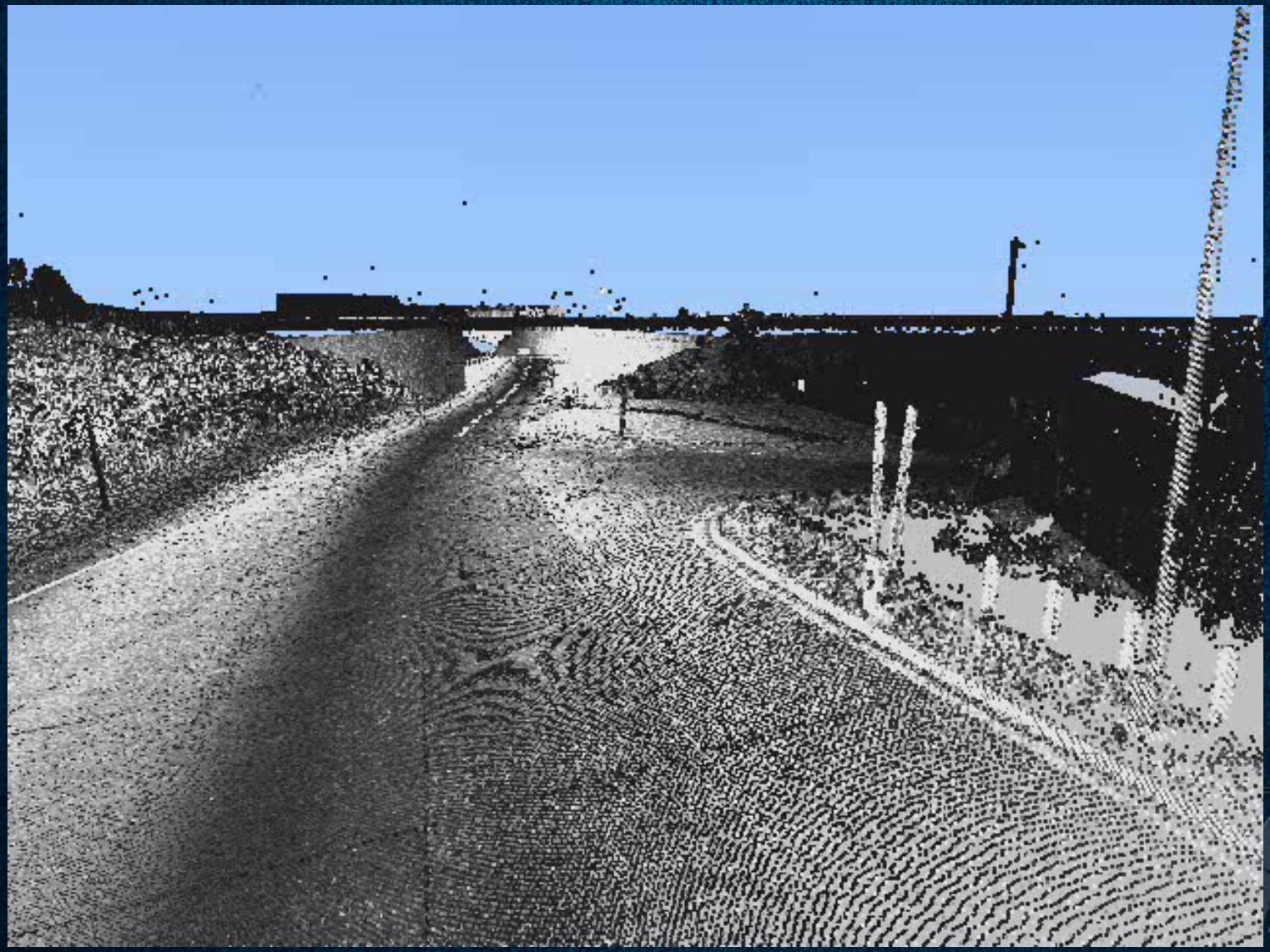

Vehicle:
Vermelho 1
Lat/long:
23°37'56"S, 46°39'03"W
Speed:
14 kph
GPS fix valid:
YES
Incident info:
None
Display Mode:
Normal
120 meters
35 R
35 L
Vermelho 1, 14 kmh
Zoom IN
RESET View
Standby Points
Toggle CAD
Display Mode
Show Incidents
SHOW Route Tools
START Driving
SHOW Info
SHOW Map Control
Zoom OUT

Safety & Situational Awareness

Safety & Situational Awareness

Source: https://www.youtube.com/watch?v=6tK4N5JWCgU

Another drive through



Benefits

- Survey-grade data*
- Data collection/survey times
- Non-intrusive
- Cost-savings
- Night time operation
- Multiple uses of one data set
- Data and sensor fusion. Ability to examine data set after the fact using video and other remote sensing technologies.

Challenges

1. Hardware
2. Data Collection / Survey Planning
3. Data Handling / Processing and Information Extraction


Thank you
QUESTIONS